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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/691,867	10/23/2003	Jong-won Kim	09717.0016US01	6738
23552	7590	10/18/2005		
MERCHANT & GOULD PC P.O. BOX 2903 MINNEAPOLIS, MN 55402-0903			EXAMINER SAYOC, EMMANUEL	
			ART UNIT	PAPER NUMBER
			3746	

DATE MAILED: 10/18/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/691,867

Applicant(s)

KIM ET AL.

Examiner

Emmanuel Sayoc

Art Unit

3746

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 23 October 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-6 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-6 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 23 October 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 1/26/04, 2/22/05.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claim 4 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 4 recites the limitation "said second compression means" in line 3. There is insufficient antecedent basis for this limitation in the claim. Since there is no mention of a plurality of compression means in the parent claim, it is assumed the applicant is referring to the compression means (single) in claim 1.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1, 4 are rejected under 35 U.S.C. 102(b) as being anticipated by Koide et al. (U.S. Pat. App. Pub. 2002/0012614 A1).

Koide et al., in Figures 1 and 5, teach a micro-compressor, comprising a sheet member (130), and a compression means (piezoelectric element 502, 503), which is disposed on the sheet member (130). The micro-compressor is characterized in that the working fluid beneath the sheet member (entering passage 144) is compressed (in pump chamber 131) and then sent to the upper side (out passage 111) of the sheet member (130). As seen in Figures 1 and 5, the examiner has chosen a reference frame such that areas beneath the sheet (130) are shown above the sheet (130) in the figures, and areas above (upper side) the sheet (130) are shown below the sheet (130) in the figures.

The compression means further comprises a pressure chamber (131), which is located at the inner part of the compression means (502, 503), a vibrating plate (142), which comprises the outer wall of the pressure chamber (131) and can be deformed to change the volume of said pressure chamber (131). The pump also comprises an inlet valve (132), which can be opened and closed for the in draft of working fluid into the pressure chamber (131), and an outlet valve (121), which can be opened and closed for the exhaustion of working fluid out of the pressure chamber (131).

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

7. Claims 2 and 3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kiode et al., as applied to claim 1, and in further view of Weinberg (U.S. 5,096,388).

Kiode et al. sets forth a device as described above, which is substantially analogous to the claimed invention. The Kiode et al. device differs from the claimed invention in that there is no explicit teaching of a plurality of compression means disposed on the sheet member. Weinberg in Figure 7, teaches an analogous piezoelectric diaphragm pump with a diaphragm (160") and a plurality of piezoelectric compression means (180, 182, 184) attached symmetrically on the diaphragm (160"). Plural piezoelectric compression means allow for increased deformation and diaphragm effective range not normally achievable by a single piezoelectric compression means. This also allows for more deformation control over various sections of the diaphragm. Therefore it would have been obvious to one of ordinary skill in the art at time the

Art Unit: 3746

invention was made to modify the Koide et al. device by, incorporating the plurality of piezoelectric compression means attached symmetrically on the diaphragm, as taught by Weinberg, in order to advantageously increase deformation and diaphragm effective range not normally achieved by a single piezoelectric compression means in order to increase pumping capacity per stroke.

8. Claims 2 and 3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kiode et al., as applied to claim 1, and in further view of Bishop et al. (U.S. 6,074,178).

Kiode et al. sets forth a device as described above, which is substantially analogous to the claimed invention. The Kiode et al. device differs from the claimed invention in that there is no explicit teaching of a plurality of compression means disposed on the sheet member. Bishop et al. in Figure 8, teach an analogous piezoelectric pump with a plurality of piezoelectric compression means (216) attached symmetrically on a pumping member (212, analogous to the Kiode et al. diaphragm). Plural piezoelectric compression means allow for compounded stroke movement for the pumping member multiplying the actuation of a single piezoelectric compression means. Therefore it would have been obvious to one of ordinary skill in the art at time the invention was made to modify the Koide et al. device by, incorporating the plurality of piezoelectric compression means, as taught by Bishop et al., in order to advantageously allow for compounded stroke movement for the pumping member multiplying the actuation of a single piezoelectric compression means in order to increase pumping

Art Unit: 3746

capacity per stroke. The vertical stacking of piezoelectric elements at the center of the pumping diaphragm (Kiode et al. 142) constitutes symmetrical arrangement.

9. Claims 5 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kiode et al., as modified by Weinberg, as applied to claim 4, and in further view of Matsumura et al. (JP 362246667 A).

Kiode et al., as modified by Weinberg, set forth a device as described above, which is substantially analogous to the claimed invention. The Kiode et al., as modified by Weinberg, device differs from the claimed invention in that there is no explicit teaching of the inlet and outlet valves being actuated by piezoelectric elements. Piezoelectric elements were well known in the art for actuating check valves. Matsumura et al. in Figures 1 and 2 teach piezoelectric elements (10, 11 see electrical contact connected to plated 10, 11) used to actuate a flap valve (8). The layer 8 constitutes an insulation layer insulating the piezoelectric layers (10, 11) from each other. This allows precise electronic control of fluid flow using low input power (column 2 lines 26-31). Therefore it would have been obvious to one of ordinary skill in the art at time the invention was made to further modify the Koide et al., as modified by Matsumura et al., device by, incorporating the piezoelectric actuation, and flap valve structure, as taught by Jackson, in order to advantageously allow for precise electronic control of valves and thus fluid flow, using low input power.

Conclusion

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The following references are cited to further show the state of the art with respect to micro-compressors.

U.S. Pat. 6,485,275 B1 to Peters et al., 6,485,275 B1 to Takeuchi et al., 6,116,866 to Tomita et al. – teach various micro compressors analogous to the claimed invention.

U.S. Pat. 6,431,212 to Hayenga et al., 6,017,016 to Jackson, 6,581,638 B2 to Frisch et al. – teach various piezoelectric actuated valves.

Contact Information

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Emmanuel Sayoc whose telephone number is (571) 272 4832. The examiner can normally be reached on M-F 8-5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy S. Thorpe can be reached on (571) 272-4444. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Emmanuel Sayoc
Examiner
Art Unit 3746

ECS